

### Claims

1. Foundation for a construction (8) with at least one pile-like device which is anchored in or on the ground (M) and basically comprises an elongate pile element (1, 21, 31, 41, 51) characterised in that the pile-like device also has at least one reinforcement element (2, 22, 32, 42, 52) which is constructed and disposed in such a way that between the reinforcement element (2, 22, 32, 42, 52) and the pile element (1, 21, 31, 41, 51) a gap is formed which can be filled at least partially with at least one free-flowing filling material (6, 10a, 10b, 30a, 30b).
2. Foundation as claimed in the preceding claim, characterised in that the pile element (1, 21, 31, 41, 51) is constructed as an inner tube around which the reinforcement element (2, 22, 32, 42, 52) is disposed.
3. Foundation as claimed in the preceding claim, characterised in that the pile element (1, 21, 31, 41, 51) is constructed as an inner tube which is disposed in the outer tube in such a way that the gap which substantially surrounds the inner tube is formed between them.
4. Foundation as claimed in any one of the preceding claims, characterised in that the foundation comprises one single pile-like device which stands substantially in the extension of the vertical axis of the construction.
5. Foundation as claimed in any one of the preceding claims, characterised in that the foundation has more than two pile-like devices.
6. Foundation as claimed in any one of the preceding claims, characterised in that all or a proportion of the filling material (10a, 30a) comprises a bulk material which is not damaging to the environment.
7. Foundation as claimed in any one of the preceding claims, characterised in that the filling material is a concrete-like mass (grout).

8. Foundation as claimed in any one of the preceding claims characterised in that in the region of the gap the pile element (1, 21, 31, 41, 51) and the reinforcement element (2, 22, 32, 42, 52) have means for increasing the transfer of shear between the elements and the filling material.
  9. Foundation as claimed in any one of the preceding claims, characterised in that when the elements are constructed as tubes the means for increasing the transfer of shear (9) are disposed on the inner face of the outer tube and on the outer face of the inner tube.
  10. Foundation as claimed in any one of the preceding claims, characterised in that the means for increasing the transfer of shear comprise annular accumulations of material applied to the tubes.
  11. Foundation as claimed in the preceding claims, characterised in that the means for increasing the transfer of shear comprise at least three fins (61) aligned parallel to the longitudinal axis of the pile-like device and connected to one of the tubes.
  12. Foundation as claimed in the preceding claims, characterised in that at least three of the fins (62) ensure the centring of the inner and outer tubes.
  13. Foundation as claimed in any one of the preceding claims, characterised in that at least three spacers are disposed permanently or temporarily in the gap between the elements by way of connecting means.
  14. Foundation as claimed in any one of the preceding claims, characterised in that between the pile-like device and the construction a junction piece (3, 23, 33, 43) is disposed which connects them to one another.
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15. Foundation as claimed in the preceding claim, characterised in that the junction piece (3, 23, 33, 43) is constructed in such a way that it has a screw flange for connection to the construction.

16. Foundation as claimed in any one of the two preceding claims, characterised in that the junction piece (3, 23, 33, 43) is connected to the pile-like device via a concrete bond (grouted joint).

17. Foundation as claimed in the preceding claims, characterised in that a part-region of the junction piece (3, 23, 33, 43) is constructed for arrangement in the gap between the inner tube and outer tube.

18. Foundation as claimed in any one of the two preceding claims, characterised in that the junction piece is equipped with means for increasing the transfer of shear between the junction piece and the filling material.

19. Foundation as claimed in any one of the preceding claims, characterised in that the construction is an offshore construction.

20. Method of introduction of a pile-like device having a pile element (1, 21, 31, 41, 51) into the ground as foundation of a construction (8), comprising the following method steps:

- introduction of the pile element (1, 21, 31, 41, 51) into the ground,
- disposing over or in the pile-like device a junction piece (3, 23, 33, 43) which serves for connection of the pile-like device to the construction (8),
- connection of the junction piece to the pile-like device,

characterised in that

- before or after the introduction of the pile element (1, 21, 31, 41, 51) into the ground a reinforcement element (2, 22, 32, 42, 52) is introduced into the ground, the reinforcement element being constructed and disposed relative to the pile element (1, 21, 31, 41, 51) in such a way that an increase in the strength of the pile-like device is achieved, and

- the gaps between the junction piece and the pile-like device are filled at least partially with a filling material.

21. Method as claimed in the preceding claim, characterised in that the reinforcement element (2, 22, 32, 42, 52) is constructed and disposed relative to the pile element (1, 21, 31, 41, 51) in such a way that a gap is produced between them which is filled at least partially with at least one filling material in an additional step.

22. Method as claimed in the preceding claim, characterised in that the additional step is carried out between the arrangement of the junction piece (3, 23, 33, 43).

23. Method as claimed in any one of the preceding claims, characterised in that in a further last step the junction between the pile-like device and the junction piece is sealed with a material which is preferably permanently resilient.

24. Method as claimed in any one of the preceding claims, characterised in that at least one of the two elements is introduced into the ground by means of a ramming method and/or drilling method.

25. Method as claimed in any one of the preceding claims, characterised in that it relates to an offshore construction and the pile-like device is introduced into the seabed.

26. Method of dismantling a foundation for a construction with a free-flowing filling material as claimed in the preceding claims, characterised in that after removal of the supported construction

- in a first step the outer tube is detached in the region of the level of the seabed,
- in a second step the outer tube is withdrawn so that the filling material escapes downwards onto the seabed,
- in a third step the inner tube is detached in the region of the level of the seabed and is then withdrawn.

27. Method as claimed in the preceding claim, characterised in that the junction piece between the foundation and the construction is only dismantled in an intermediate step between step one and step two.

28. Wind power installation with a foundation as claimed in any one of the preceding claims.